CLAIMS

1. A device for controlling an electric motor of the electronic switching type comprising N pairs of poles and P phases, the said device comprising:

- a coder (2) intended to be rotated conjointly with the rotor (1) of the motor, the said coder comprising a main multipole track (2a) and a so-called "revolution pip" multipole track (2b) which are concentric, the said revolution pip track comprising N singularities (2b1) equally distributed angularly;

- a fixed sensor (3) disposed opposite to and at an air-gap distance from the coder (2), comprising at least three sensitive elements, at least two of which are positioned opposite the main track (2a) so as to deliver two periodic electrical signals S1, S2 in quadrature and at least one of which is positioned opposite the revolution pip track (2b) so as to deliver an electrical signal S3, the sensor (3) comprising an electronic circuit able, from the signals S1, S2 and S3, to deliver two square digital position signals (A, B) in quadrature which represent the angular position of the rotor (1) and a revolution pip signal (C) in the form of N pulses per revolution of the coder (2);

- a circuit for switching the currents in the phase windings of the motor which comprises 2*P*N switches;

- a circuit for controlling the switching circuit which is able:

  - when a pulse of the revolution pip signal (C) is detected, to determine the state of the switching logic of the currents in the phase windings which corresponds to the angular position of the said pulse;

- according to the position signals (A, B) detected, to determine continuously the state of the switching logic which is adapted to the angular position of the rotor (1);

- to supply the switching signals for the switches which correspond to the state of the logic determined by the revolution pip signal (C) or by the position signals (A, B).

2. A device according to Claim 1, characterised in that it also comprises:

- a third multipole track (4) comprising N pairs of poles (4a);

- a second fixed sensor (5) comprising P sensitive elements, the said sensitive elements being arranged opposite to and at an air-gap distance from the third multipole track (4) so as to deliver signals (U, V, W) for switching the currents in the phase windings.

3. A device according to Claim 2, characterised in that the third multipole track (4) is disposed on the coder (2) whilst being concentric with the main track (2a) and revolution pip track (2b).

4. A device according to Claim 2, characterised in that the third multipole track (4) is provided on a second coder (6).

5. A device according to any one of Claims 1 to 4, characterised in that each multipole track (2a, 2b, 4) is formed from a magnetic ring on which there are magnetised North and South poles equally distributed with a constant angular width, a magnetic singularity (2b1) of the revolution pip track (2b) being formed by two pairs of

adjacent poles whose junction is different from the others.

6. A device according to any one of Claims 2 to 5, characterised in that the first and second sensors (3, 5) are integrated in one and the same measuring means (7).

7. A bearing of the type comprising a fixed race (8) intended to be associated with a fixed member, a rotating race (9) intended to be set in rotation by the rotor (1) of the electric motor and rolling bodies (10) disposed between the said races, the said bearing being characterised in that at least one coder (2, 6) of a control device according to any one of Claims 1 to 6 is associated with the rotating race (9).

8. A bearing according to Claim 7, characterised in that at least one coder (2, 6) is associated with the rotating race (9) so that the external face of the said coder is substantially contained in the plane P of a lateral face of the fixed race (8).

9. A bearing according to Claim 7 or 8, characterised in that at least one coder (2, 6) is associated with the rotating race (9) so that the external face of the said coder is substantially contained in the plane P' of a lateral face of the rotating race (9).

10. A bearing according to any one of Claims 7 to 9, characterised in that the rotating race (9) comprises an axial extension (9a) on which at least one coder (2, 6) is associated.

11. A bearing according to any one of Claims 7 to 10, characterised in that at least one coder (2, 6) is associated on the rotating race (9) so as to allow a radial reading of the pulses.

12. A bearing according to any one of Claims 7 to 11, characterised in that at least one coder (2, 6) is associated on the rotating race (9) so as to allow a facial reading of the pulses.

13. A bearing according to any one of Claims 7 to 12, characterised in that at least one coder (2, 6) is carried by an association armature (11).

14. A bearing according to Claim 13 when it depends on Claim 4, characterised in that the two coders (2, 6) are carried by the same association armature (11).

15. A bearing according to Claim 14, characterised in that the two coders (2, 6) are provided on the same side of the rolling bodies (10).

16. A bearing according to Claim 15, characterised in that the two coders (2, 6) are disposed opposite each other.

17. A bearing according to Claim 14, characterised in that the two coders (2, 6) are provided on each side of the rolling bodies (10).

18. A bearing according to any one of Claims 7 to 17, characterised in that at least one sensor (3, 5) of a control device according to any one of Claims 1 to 6 is associated with the fixed race (8) of the bearing.

19. An electronically switched motor equipped with a control device according to any one of Claims 1 to 6, of the type comprising a rotor (1) mounted for rotation by means of a bearing according to Claim 18.

20. An electronically switched motor equipped with a control device according to any one of Claims 1 to 6, of the type comprising a rotor (1) mounted for rotation by means of

a bearing according to any one of Claims 7 to 18, at least one sensor (3, 5) being associated with a fixed piece of the motor.

21. A motor according to Claim 20, characterised in that at least one sensor (3, 5) comprises at least one elastic support tongue (18c) intended to allow the positioning of the sensitive elements at an air-gap distance from the coder (2, 6) whose pulses they are to detect.

22. A motor according to any one of Claims 19 to 21, characterised in that at least one coder (2, 6) is associated with the rotor (1).

23. An electronically switched motor equipped with a control device according to any one of Claims 1 to 6, of the type comprising a rotor (1) and a fixed piece, in which at least one coder (2, 6) is associated with the rotor (1) and at least one sensor (3, 5) is associated with the fixed piece.

24. A method for controlling a motor according to any one of Claims 19 to 23 when it depends on Claim 1, characterised in that it comprises the following successive steps:

- supply of the motor according to a pre-established time sequence so as to allow the rotation of the rotor (1) and therefore that of the coder (2);

- detection of a first revolution pip pulse;

- determination of the state of the switching logic corresponding to the angular position of the said pulse;

- sending to the switching circuit switching signals corresponding to the state determined;

- iterative determination of the subsequent states of

the switching logic from the position signals (A, B);

- sending to the switching circuits switching signals corresponding to the states determined.

25. A method for controlling a motor according to any one of Claims 19 to 23 when it depends on Claim 2, characterised in that it comprises the following successive steps:

- initial use of the switching signals (U, V, W) for determining the states of the switching logic between the phases of the motor;

- detection of a first revolution pip pulse;

- determination of the state of the switching logic corresponding to the angular position of the said pulse;

- sending to the switching circuit the switching signals corresponding to the determined state;

- iterative determination of the subsequent states of the switching logic from the position signals (A, B);

- sending to the switching circuit switching signals corresponding to the determined states.

26. A method according to Claim 25, characterised in that it comprises an iterative step of comparison between the position signals (A, B) and the revolution pip signals (C), so as to detect any abnormality and, if an abnormality is detected, the determination of the subsequent switching times from the switching signals (U, V, W).

27. A method according to any one of Claims 24 to 26, characterised in that it comprises a prior step of angular indexing of the revolution pip pulses with respect to the zeroing of the electromotive forces in the phases of the motor.